

Reciprocity across Modes of Supply in the World Trade Organization

A Negotiating Formula

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If negotiations on trade in services at the World Trade Organization are to advance liberalization beyond levels undertaken unilaterally and lead to more balanced outcomes, reciprocity must play a greater role in negotiations. This may be facilitated by the use of negotiating rules that establish credible links across sectors and modes of delivery.



Summary findings

Negotiations on trade in services at the World Trade Organization (WTO) have so far produced little liberalization beyond levels countries have undertaken unilaterally. One reason: limited application of the traditional negotiating principle of reciprocity.

In particular, participants have failed to exploit the scope of the services agreement (GATS) for the exchange of market-access “concessions” across different modes of supply — cross-border delivery and the movement of capital and workers.

Using the Heckscher-Ohlin-Vanek framework, Mattoo and Olarreaga propose a negotiating formula that generalizes the fundamental WTO principle of reciprocity to include alternative modes of delivery.

Adoption of this formula as a basis for negotiations could bring greater commitments to liberalization on all modes of delivery, producing substantial gains in global welfare and more balanced outcomes.

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**Reciprocity across modes of supply in the World Trade Organization:
a negotiating formula ***

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NON-TECHNICAL SUMMARY

Reciprocity is a central principle governing WTO negotiations: one country reduces its level of protection in return for a reciprocal reduction from its trading partner. While reciprocity-based negotiations are widely credited with the substantial reduction in levels of protection achieved in goods trade, it is surprising that the relative neglect of the principle has not conversely been seen as the reason for the disappointing results in two areas: negotiations involving developing countries and those on trade in services. Developing countries traditionally relied on the generosity of their trading partners for market access (e.g. through the generalized system of preferences), and liberalized their own markets either because of the realization that this made good economic sense or under pressure from multilateral lending organizations. Neither strategy has been entirely successful: access to foreign markets in key areas like textiles and agriculture remains blocked, and domestic reform often remains stalled.

The General Agreement on Trade in Services (GATS) had a comprehensive structure. In recognition of the fact that many services require proximity between consumers and suppliers, the Agreement went beyond the traditional notion of trade (including only cross-border delivery) to encompass supply through the movement of both capital and labor. In principle, there was scope for developed and developing countries to exploit their modal comparative advantage: improved access for capital from developed countries being exchanged for improved temporary access for individual service providers from developing countries. In practice, there was little political will to improve access for foreign individuals (except for the limited class of skilled intra-corporate transferees), and a trade-off between modes of delivery simply did not take place.

This note argues that a more explicit and wider application of the principle of reciprocity is needed to deliver greater liberalization and more balanced outcomes. In particular, the application of the principle across the different modes of supply in services could help break the political stalemate on the movement of individuals. The fact of severe shortages of skilled labour in the US and the powerful constituency of high-technology companies

lobbying for relaxation of visa limits makes this a propitious time to put labour mobility squarely on the negotiating agenda.

Reciprocity in trade negotiations across modes of supply implies that the changes in income associated with foreign factor flows (direct factor flows) and the changes in the volume of trade associated with cross-border trade (indirect factor trade) need to be equalized. If reciprocity across modes of supply is achieved, then the terms-of-trade effect will also be neutralized, thus avoiding any international redistribution of income associated with trade policy changes.

The formula we derive to achieve reciprocity in trade negotiations across modes of supply has several practical applications. For instance, it can be used to calculate the level of concessions in terms of temporary movement of persons that would be required to be granted in exchange for concessions obtained with respect to other modes of supply. The concessions in terms of personnel movements could be implemented through “foreign labor content entitlements” provided to domestic firms. These entitlements would be global rather than bilateral, and firms would be free to determine the extent and pattern of use. The informational requirements of the formula, while greater than those in conventional negotiations, are not difficult to meet.

1. Introduction

Reciprocity is a central principle governing WTO negotiations: one country reduces its level of protection in return for a reciprocal reduction from its trading partner. This emphasis on achieving a “balance of (liberalizing) concessions” has led to the perception of WTO negotiations as a mercantilist process driven by political forces that nevertheless leads to the desirable outcome of reduced levels of protection. In an important recent paper, Bagwell and Staiger (1999) show that reciprocity can be given a more direct positive economic interpretation: it serves to neutralize the adverse terms of trade effects associated with unilateral reductions in protection, and therefore leads to greater liberalization.

While reciprocity-based negotiations are widely credited with the substantial reduction in levels of protection achieved in goods trade, it is surprising that the relative neglect of the principle has not conversely been seen as the reason for the disappointing results in two areas: negotiations involving developing countries and those on trade in services. Developing countries traditionally relied on the generosity of their trading partners for market access (e.g. through the generalized system of preferences), and liberalized their own markets either because of the realization that this made good economic sense or under pressure from multilateral lending organizations. Neither strategy has been entirely successful: access to foreign markets in key areas like textiles and agriculture remains blocked, and domestic reform often remains stalled.

The General Agreement on Trade in Services (GATS) had a deliberately symmetric structure. In recognition of the fact that many services require proximity between consumers and suppliers, the Agreement went beyond the traditional notion of trade (including only cross-border delivery) to encompass supply through the movement of both capital and labor. In principle, there was scope for developed and developing countries to exploit their modal comparative advantage: improved access for capital from developed countries being exchanged for improved temporary access for individual service providers from developing countries. In practice, there was little political will to

improve access for foreign individuals (except for the limited class of skilled intra-corporate transferees), and a trade-off between modes of delivery simply did not take place.¹ So the GATS commitments reflect for the most part the existing levels of unilaterally determined policy rather than liberalization achieved through a reciprocal exchange of “concessions”.

This note argues that a more explicit and wider application of the principle of reciprocity is needed to deliver greater liberalization and more balanced outcomes. In particular, the application of the principle across the different modes of supply in services could help break the political stalemate on the movement of individuals. The fact of severe shortages of skilled labour in the US and the powerful constituency of high-technology companies lobbying for relaxation of visa limits makes this a propitious time to put labour mobility on the negotiating agenda.² With developing countries increasingly opening up their markets, the bargaining dynamic is changing and the prospects for serious inter-modal trade-offs –such as obtaining labor movement in return for allowing greater commercial presence for foreign service providers - are now greater.

Would it be desirable and feasible to create an institutional commitment to implement such a reciprocity rule? Consider desirability first. Might it not be argued that most of the gains from trade could be realized by providing for freedom to exchange products and it is unnecessary to deepen WTO negotiations to cover factor movements? In the context of many services for which cross-border delivery is not feasible, the movement of factors is needed to make trade possible. And there can be little doubt that significant welfare gains could be realized by allowing greater movement of capital and labor. Even in the case of goods, trade alone leads to the equalization of factor rewards only under restrictive assumptions, so there usually remains scope for further welfare gains by allowing factors to move across borders.³ Secondly, the scope for governments to increase the political support for reform would be greater if the range of negotiating issues were widened. Thus, it may be possible to achieve more ambitious deals by creating links, not only between the different modes, but also between trade in goods and trade in services.

There are two aspects to the question of feasibility: political and technical. Would WTO Members be willing to accept a rule which obliged them to exchange concessions across modes, and in particular, to concede greater access to foreign individuals? First, at the international level, there is a growing recognition of the need to achieve more balanced outcomes in the WTO between developing and developed countries, to avoid the polarization observed in Seattle (Panagariya, 1999 and Hertel, Hoekman and Martin, 2000, Wang and Winters, 2000). There can be little doubt that meaningful negotiations on the movements of individuals (mode 4) would enhance the engagement of developing countries in the WTO system. Secondly, some of the political difficulties could also be overcome by clarifying that liberalization is only with respect to temporary movement of service suppliers, and does not imply migration. A clear distinction along these lines should help alleviate some of the social and political fears associated with permanent movements of persons.

But is it technically feasible to link concessions across modes? How is a tariff reduction to be compared with greater access for investment or individuals? This note suggests a formula through which concessions across modes and sectors could be linked. The formula should be seen, not as something to be applied with extreme precision, but as a rough rule-of-thumb to ensure a certain balance of concessions. The reciprocity rule, developed in Section 2 ensures that the terms-of-trade effects of policy changes are neutralized to avoid international redistribution of income, as in Bagwell and Staiger (1999). It is shown that neutralization of terms-of-trade occurs when reciprocity is achieved across changes in total volumes of factor trade, both direct and indirect. Therefore, inter-modal reciprocity implies that the changes in income associated with foreign factor flows (direct factor trade) and the changes in the volume of trade associated with cross-border trade (indirect factor trade) are equalized.

The informational requirements of the formula, while greater than those in conventional negotiations, are not difficult to meet. The formula is developed in section 2. Examples of how the formula could be applied, including the idea of “foreign labour content

entitlements”, are presented in section 3, where we also discuss practical other practical considerations. Section 4 concludes.

2. Reciprocity and neutralization of the terms of trade

Reciprocity for trade in goods can be seen to imply that any change in the import volume associated with a change in trade policy should be matched by a similar increase in export volume (measured at initial world prices).⁴ In a framework where direct factor flows are also present, reciprocity must be defined across both changes in the volume of trade in goods and changes in the income of factor movements across countries.

In order to derive an explicit reciprocity formula across goods and factor movements, let us assume for simplicity a two-country world: the home country and the rest-of-the world. Variables for the rest-of-the world will be indicated by superscript “*”. The current account of the home country is then given by:

$$p^w \cdot x + \omega \cdot f^D = b \quad (1)$$

where “ \cdot ” stands for the inner product of the two vectors; b is the current account balance; p^w is a $nx1$ vector of world prices; x is a $nx1$ vector of net exports of the home country. Thus positive elements imply that the good is exported by the home country and negative elements imply that the good is imported. f^D is a $nx1$ vector of direct factor net exports. Thus a positive entry implies that the home country is an exporter of that factor to the rest of the world and a negative element implies that the factor is imported; ω is a combination of the $nx1$ vector of factor prices in the home country and in the rest-of-the world.⁵ It will be equal to the vector of the home country factor prices when the factor is imported and equal to the vector of rest-of-the world factor prices when the factor is exported.⁶ That is $\omega = D_{m=1} w + (U - D_{m=1}) w^*$, where $U = \text{diag}(u)$ is a diagonal matrix of the unit vector u ; $D_{m=1}$ is a diagonal matrix of the vector $d_{m=1}$, which takes the value 1

when the factor is imported and 0 otherwise; w and w^* are the vectors of factor prices in the home country and the rest-of-the world respectively.

Thus, the first element on the left-hand-side of (1) is the trade balance and the second element is the balance of interest and other factor payments with the rest-of-the world. Note that the current account may include other elements, such as grants, transfers and gifts that we assume are not correlated with product and factor trade policy.

Following Vanek (1968), net exports can be written in terms of their factor content, i.e., $x^C = A^{-1} f^I$, where A is a non-singular square matrix of input-output coefficients; f^I is a vector of indirect net factor trade through trade in goods. Substituting into (1) and totally differentiating (assuming no change in the current account balance) for changes in goods or factor trade policy yields:

$$\Delta p^W \cdot A^{-1} f^I + p^W \cdot A^{-1} \Delta f^I + \omega \cdot \Delta f^D + \Delta \omega \cdot f^D = 0 \quad (2)$$

where “ Δ ” stands for change. Note that for simplicity, and for the formula to be easily applied, we assume that input-output coefficients are fixed (in each country), i.e., A , is not affected by changes in policies.

To obtain the relationship between world prices and factor prices, we assume without loss of generality that tariffs are specific.⁷ We also assume that the zero-profit condition holds in the home country and in the rest-of-the world. In the service sector, specific tariffs should be seen as simply reflecting the difference between world prices and the domestic price. Thus,

$$\begin{aligned} w &= D_{m=1} A^{-1} (p^W + t) + (U - D_{m=1}) A^{*-1} (p^W + t^*) \\ \Delta w &= [D_{m=1} A^{-1} + (U - D_{m=1}) A^{*-1}] \Delta p^W + D_{m=1} A^{-1} \Delta t + (U - D_{m=1}) A^{*-1} \Delta t^* \end{aligned} \quad (3)$$

where t and t^* are the specific tariffs in the home country and rest-of-the world, respectively, and A^* is the matrix of input-output coefficients in the rest-of-the world. Note that we assume no reversal of the trade pattern and therefore $D_{m=1}$ is fixed. Replacing (3) into (2) and rearranging yields:

$$\begin{aligned} \Delta p^w \cdot [A^{-1}(f^I + D_{m=1}f^D) + (U - D_{m=1})A^{*-1}f^D] = & -[A^{-1}p^w \cdot \Delta f^I + \\ & (D_{m=1}A^{-1}(p^w + t) + (U - D_{m=1})A^{*-1}(p^w + t^*)) \cdot \Delta f^D + \\ & (D_{m=1}A^{-1}\Delta t + (U - D_{m=1})A^{*-1}\Delta t^*) \cdot f^D] \end{aligned} \quad (4)$$

The definition of reciprocity in the presence of direct and indirect factor movements corresponds to the right-hand-side of equation (4). If the right-hand side of equation (4) is equal to zero, then changes in indirect factor flows plus changes in income of direct factor flows would have to be equalized, which we defined as reciprocity in the presence of both indirect and direct factor flows. Note that this definition of reciprocity will also imply that terms-of-trade are neutralized as the left-hand-side of (4) will then be equal to zero.⁸

The first term on the right-hand side of (4) implies reciprocity in terms of volume of trade (measured at existing world prices). This will obviously not be enough to ensure terms-of-trade neutrality in the presence of direct factor movements. The second term implies reciprocity in terms of direct factor flows measured at existing domestic prices. The third element implies reciprocity in terms of foreign factor income changes associated with changes in policies. The idea is that in the presence of foreign factors, a change in trade policy will affect the revenue of foreign factors in the domestic economy. As an example, a tariff reduction in an import-competing sector will negatively affect the factor that is intensively used in that sector, which in the presence of foreign factors leads to international income redistribution that needs to be neutralized.⁹

Equation (4) shows that for reciprocity to neutralize the terms-of-trade effects (the only economic rationale for non-cooperative bargaining or cooperative trade negotiations, as convincingly argued by Bagwell and Staiger, 1999), it should cover trade in both

products and factors. Moreover, as argued before by linking negotiations across different modes of supply, the set of possible outcomes of the negotiations expand and deals that would have been impossible otherwise become feasible. Two examples of the use of (4) to link negotiations across different modes of supply are explored in section 3.

Finally, note that the only assumptions required to obtain the formula in (4) is the zero-profit condition, no reversal in trade-patterns and fix input-output coefficients. All these assumptions could be relaxed to obtain a modified version of (4) if necessary.¹⁰

3. Reciprocity formula for concessions across modes of supply

In this section, we show with two simple examples, how concessions across different modes of supply can be linked by setting the right-hand side of equation (4) equal to zero. The first example explores how concessions by one (developing) country in terms of market access in goods trade can be compensated by opening access to movement of individuals (mode 4) by another (developed) country. The second example shows how the formula can be used to compensate for openness to an increase in foreign ownership in one service sector in a (developing) country, by again opening access to movement of individuals in another (developed) country.

3.1 Exchanging goods market access for movements of individuals access

Assume that two countries, e.g., India and the US are negotiating over tariff reduction in the automobile sector. Indian tariff in 1992 on vehicles was around 62 percent, whereas the US tariff on automobiles was close to 4 percent. There is very little scope for mutually beneficial reductions, regardless of the fact that India will probably not be competitive in the US vehicle market. Our formula on the right-hand side of equation (4) can then be used to achieve reciprocity across sectors and different modes of supply. Here we explore the possibility that an Indian tariff reduction on vehicles may be compensated by an opening of the US market to movement of persons (mode 4).

Let us assume that the US would like India to reduce its tariffs so that India's imports of vehicles from the US increase by 10 units. For simplicity let us also assume that there is no presence of US factors of production (foreign investment, in particular) in India so that we can neglect the third term on the right-hand side of equation (4), i.e. $f^D = 0$.

What should be the US market access concession in terms of movement of persons to compensate India for its market access concession in the vehicles market of 10 units? The answer to this question is obtained by setting the right-hand-side of (4) equal to zero and solving for $\Delta f^D = [\Delta \ell^D; \Delta \kappa^D]$, where $\Delta \ell^D$ is the increase in exports of persons in India to the US market and $\Delta \kappa^D$ is the increase in exports of capital from India. We assume that neither India nor the US is interested in access to the their partner's capital market, and therefore set $\Delta \kappa^D = 0$. Note that here the capital and labor changes are assumed to be scalars, but they could easily be interpreted as vectors had we assumed different types of labor and capital.

For the purpose of the example, normalize all units so that all world prices are initially equal to 1. Then note that the first term on the right hand side of (4) is equal to 10, given India's market access concession in the vehicle sector, i.e., $A^{-1} p^W \cdot \Delta f^I = -10$. Using (4), the US market access concession in terms of movements of persons is obtained by solving:

$$(D_{m=1} A^{-1} (p^W + t)) + ((U - D_{m=1}) A^{*-1} (p^W + t^*)) \cdot \Delta f^D = 10 \quad (5)$$

Recalling that $\Delta \kappa^D = 0$, by assumption and that the diagonal element in $D_{m=1} = 0$ if the factor (labor) is exported, one needs information on the input-output matrix and domestic prices in the US, A^* and $p^W + t^*$, respectively, to solve for $\Delta \ell^D$. For the purpose of the example, let us assume that the US economy is composed of two sectors (vehicles, denoted sector 1, and the rest of the economy, denoted sector 2) and as before two factors of production are used, capital and labor. Thus:¹¹

$$A^* = \begin{bmatrix} a_{\ell 1} & a_{\kappa 1} \\ a_{\ell 2} & a_{\kappa 2} \end{bmatrix} = \begin{bmatrix} 0.14 & 0.23 \\ 0.15 & 0.33 \end{bmatrix} \text{ and } p^w + t^* = \begin{bmatrix} p_1^* \\ p_2^* \end{bmatrix} = \begin{bmatrix} 1.1 \\ 1.04 \end{bmatrix} \quad (6)$$

Then solving (5) for $\Delta \ell^D$, using (6) yields:

$$\Delta \ell^D = \frac{10}{\frac{1}{|A^*|}(a_{\kappa 2}p_1^* - a_{\ell 2}p_2^*)} = \frac{10}{\frac{1}{0.01}(0.36 - 0.16)} = 0.5 \quad (7)$$

where $|A^*| = a_{\ell 1}a_{\kappa 2} - a_{\kappa 1}a_{\ell 2}$ is the determinant of A^* . Thus an increase of 10 units in market access of India for US exporters of vehicles can be reciprocated by an increase of 0.5 units of labor from India to the US.

3.2 Exchanging foreign investment access for movement of individuals access

Assume India and the US are negotiating access on software services in the next round of negotiations (and there is no other sector open to negotiations). For simplicity, let us assume that cross-border trade in software services is free of restrictions, which allows us to drop the first term on the right-hand-side of (4) as concessions cannot be granted in terms of cross-border trade opening. But trade can also occur through the movement of factors. Let us assume that the US negotiators require India to open its software market to the entry of 10 units of US capital (which could be interpreted as concessions in terms of entry of a US firm or allowing for US ownership of Indian software firms), i.e., $\Delta \kappa^D = -10$. Again, to simplify we assume no US factor presence initially in the Indian market and drop the third term in equation (4). A sufficient condition for reciprocity and neutralization of the terms-of-trade will be achieved, if the right-hand-side of equation (4) is equal to zero, which given the above assumptions only requires the second term in (4) to be zero. Thus,

$$(D_{m=1}A^{-1}(p^w + t)) + ((U - D_{m=1})A^{*-1}(p^w + t^*)) \cdot \Delta f^D = 0 \quad (8)$$

Let us assume, for simplicity, that the input-output matrix is the same in India and the US, i.e., $A = A^*$, and that A^* is given by the matrix in equation (6). Recalling that tariffs are zero in both countries and that units are chosen so that world prices are unit, and further assuming there are no other non-tariff barriers, equation (8) becomes:

$$A^{-1} p^w \cdot \Delta f^D = \frac{1}{|A|} (a_{\kappa 2} - a_{\ell 2}) \Delta \ell^D + \frac{1}{|A|} (a_{\kappa 1} - a_{\ell 1}) (-10) = 0 \quad (9)$$

Solving (9) for $\Delta \ell^D$ yields:

$$\Delta \ell^D = \frac{10(a_{\kappa 1} - a_{\ell 1})}{a_{\kappa 2} - a_{\ell 2}} = \frac{10(0.23 - 0.14)}{0.33 - 0.15} = 5 \quad (10)$$

Thus a concession of India equivalent to the entry of 10 units of capital into the Indian market can be reciprocated by an US concession in terms of entry of 5 units of Indian labor.

3.3 Practical considerations

The previous sections have shown how the formula in equation (4) can be used to define quantitatively reciprocity across different sectors and modes of supply. Notwithstanding the mathematical detail, the formula is not difficult to apply. Data requirements are not excessive, and consist of world prices, tariffs (or tariff equivalents) and input-output tables in the negotiating partners. It should be possible to obtain at least crude estimates of each variable. It is not our intention that the formula be applied in an extremely precise manner. Rather we seek to suggest a mechanism that would ensure a certain rough balance of concessions to satisfy the broad principle of reciprocity.

This paper has presented the negotiating formula using a two country model. However, this does not imply the imposition of bilateral trade balancing conditions. Just as in the

case of conventional negotiations on goods tariffs, the outcome of bilateral negotiations would be multilateralised. This may be easier to accomplish when we are dealing with tariff commitments rather than the quota-type commitments which would emerge from negotiations involving factors. Nevertheless, it should be possible to allocate the quotas on a non-discriminatory basis. For instance, if US cross-border exports of services were to increase by a certain amount due to changes in rest-of-the world policies, the US would be required to provide domestic firms with “foreign labor entitlements” that would allow them to hire foreign workers, on the basis of the formula derived earlier. These entitlements could be calculated on a sectoral basis or on an aggregative basis - so that foreign factors could be employed where they are most productive.

4. Conclusions

In the services negotiations, developing countries have resisted the use of horizontal formulae – preferring the use of a request and offer approach. This stems from defensive considerations and a belief that they would be obliged to concede excessively high levels of openness if a formula approach was adopted. We believe that this opposition is ill-advised. A collective commitment to the use of appropriately designed formula offers the best chance of linking different modes of delivery and extracting meaningful commitments on the movement of natural persons, the mode in which developing countries have a comparative advantage.

Is the application of this formula likely to be politically feasible? We have said earlier that given current shortages of labour in various markets, this is a propitious time to seek liberalization commitments on this mode. Establishing clear links between increased exports and increased foreign labour content entitlements may also help make the political case. The presence of foreign workers would be seen as a direct consequence of increased opportunities for export abroad, and also as contributing to the increased competitiveness which makes it possible to exploit these opportunities. The link would be most visible if the entitlements were calculated on a sectoral basis, i.e., increased exports of software services lead to increased entitlements to employ foreign software engineers.

But there may be scope for cross-sectoral trade-offs. And it may be desirable to make these entitlements tradeable so as to ensure that foreign factors are employed where they are most productive.

One undesirable aspect of an emphasis on reciprocity is that it creates the temptation to hold back from unilateral liberalization. This is why most economists view reciprocity with suspicion. In a companion piece, (Mattoo and Olarreaga, 2000) we have suggested how this hold-back problem can be overcome by the creation of ex ante rules which assure that credit would be given for unilateral liberalization in future rounds of negotiations. The impulse to liberalize unilaterally then need not be inhibited by the fear of loss of negotiating coinage.

The narrowest application of our formula would be across modes of supply within the services sectors alone. A somewhat wider use would be also to include cross-border trade in goods. This domain would correspond to the current coverage of WTO rules. The widest application would extend to the movement of factors involved in goods production also. In a sense, there is a strange asymmetry in the current WTO structure, which the creation of rules for investment in goods would partially remedy. The existing commitments on the movement of individuals also have a curious aspect: in principle, they cover the movement of individuals to work in the production of services like banking, but not the production of goods like cars, but in practice it may be impossible to make such a distinction. For instance, when the US allows Indian software engineers to seek employment in the US market, it does not prevent them from working in the car industry.

One argument for widening the negotiating domain is that it offers more scope for overcoming domestic political economy constraints and hence more scope for an exchange of liberalizing concessions. If a truly general framework of negotiations on trade in products and factors were established, our formula would offer a meaningful basis for the exchange of concessions.

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Endnotes

¹ The “single-undertaking” approach of the Uruguay Round also provided some scope for inter-modal concessions, but did little to influence commitments on the movements of persons. Single-undertaking implied that members could not pick and choose agreements, but had to accept the entire Uruguay Round package.

² See the recent paper by Masters and Ruthizer (2000) or Bill Gates’ recent testimony before congress arguing for allowing more software engineers to enter the US labor market.

³ In the goods context, trade in goods is a substitute for trade in factors in the standard Hecksher-Ohlin framework but once we relax the assumptions of this model, and allow, for instance, for increasing returns to scale, trade in goods and factors may well be complementary (see Markusen, 1983).

⁴ For a discussion of reciprocity along these lines see Dam (1970), Bhagwati (1991) and Bagwell and Staiger (1999).

⁵ Note that by assuming that foreign factors receive the complete domestic factor price, we implicitly assume that there are no friction associated with factor movement. In a frictionless world, factor price differences can only exist in the presence of barriers to factor movements.

⁶ Here we implicitly assume that the same factor cannot be imported and exported at the same time. To make this consistent with two-way factor flows, one can imagine disaggregating the vector of direct factor flows not only by type, but also by direction of flow.

⁷ To assume ad-valorem tariff will not change our main results.

⁸ As in Bagwell and Staiger (1999) this is a sufficient though not necessary condition for terms-of-trade to be neutralized. For empirical evidence that terms-of-trade may matter in “small” developing countries see Chang and Winters (1999).

⁹ The neutralization of this type of international redistribution of income ensures that the concessions are also mutually beneficial. In the absence of such neutralization, one of the trading partners may loose from the deal, along the lines explored by Brecher and Diaz-Alejandro (1977).

¹⁰ Note that the changes in factor and goods flows are taken as exogenous here, where in reality a change in direct factor flows may affect trade in goods. However, we abstract from these effects since we are not interested in “general equilibrium effects” due to changes in one particular policy but in changes in policies across countries that correspond to the notion of reciprocity in terms of market access. Also to apply the formula some elasticity will be needed to calculate the effect that the change in policy (that governments control) has on factor flows (direct and indirect).

¹¹ The input output coefficient are calculated by taken the share of labor payments and capital payments in total output for the transport sector of the United states for sector 1 and for the whole manufacturing in sector 2. Data is from Unido and corresponds to the year 1997.

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